City and County of San Francisco
Department of City Planning

SAN FRANCISCO CONTAINER TERMINAL MODERNIZATION

DRAFT
Supplemental
Environmental Impact Report

85.123E

State Clearinghouse No. 85062513

Draft Supplemental EIR Publication Date: September 12, 1986
Public Comment Period: September 12, 1986 to October 16, 1986
Public Hearing Date: October 16, 1986

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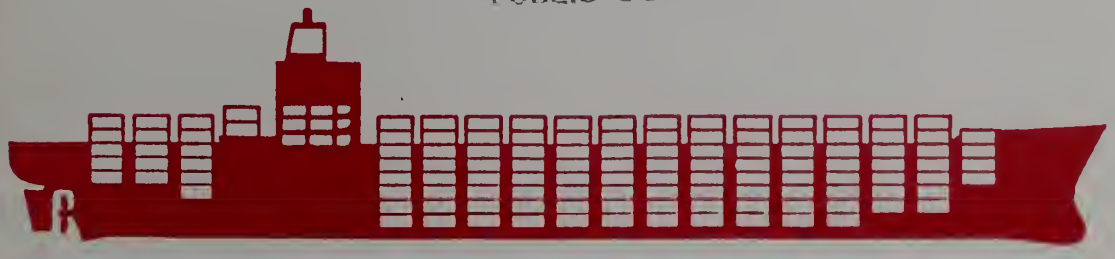

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CHAPTER I. INTRODUCTION

Background

Modernization and expansion of container freight handling facilities at the San Francisco Container Terminal (SFCT) was evaluated in FEIR 85.123E, State Clearinghouse No. 85062513, certified January 23, 1986.

Phase I of the project evaluated in the SFCT FEIR includes conversion of the North Terminal (Pier 80, formerly referred to as the Army Street Terminal) into a full containerized cargo handling facility; development of an Intermodal Container Transfer Facility (ICTF) at the south edge of the South Terminal (Piers 94/96) for the direct transfer of cargo between ship and train without intermediate use of highway vehicles; and construction of a new drawbridge across Islais Creek to avoid trucking cargo over public streets to move it between the North Terminal and the South Terminal.

Phase II development, also analyzed in the SFCT FEIR, calls for provision of two container berths at the north side of the South Terminal (south side of Islais Creek) through conversion of an existing break-bulk berth and addition of a new berth.

Purpose of Supplemental EIR

The two existing berths at the South Terminal are designed for maximum dredged depths of -40 feet at mean lower low water (MLLW, see page 5 for definition). Existing approach channels are authorized and maintained at -40 feet MLLW. For the new generation large container ships, these chan-

nels no longer provide optimum navigational flexibility for all tidal stages and current conditions because of the greater difficulty of turning the larger vessels now in use. Maneuvering and navigational safety options would be improved by widening turning areas and providing two new access/egress channels which would allow vessel movements under all tidal conditions. The environmental impacts of the proposed dredging necessary to create the two new channels and widen a third channel will be evaluated in this Supplemental EIR (SEIR).

CHAPTER II. SUMMARY

The Port of San Francisco proposes the dredging of two new channels and the dredging of a third area adjacent to an existing channel in San Francisco Bay to a maximum depth of -40 feet MLLW[1] to allow improved access of deep-draft vessels to the San Francisco Container Terminal (SFCT) and to provide improved ship maneuverability and navigational safety under all tidal conditions.

The total area to be dredged would be approximately 76 acres and would involve the removal of an estimated 1.4 million cubic yards of sediment. The project would take about twelve weeks. The dredge spoils would be deposited at a site approved by the Army Corps of Engineers and the Bay Conservation and Development Commission.

Impacts

The proposed project could have water quality impacts caused by the release of toxic substances previously trapped in lower Bay sediment layers and resuspended in the water column by dredging activities. Because of this, the sediments that would be dredged have been analyzed for toxic inorganic and organic materials which might be present. Tests for materials (heavy metals, PCBs, oil and grease, pesticides and petroleum hydrocarbons) dissolving out of the sediments were all negative. Tests for these materials in the sediments themselves were all negative or showed concentrations similar to the lowest concentrations found in the Bay.

The project could cause temporary increases in turbidity and sedimentation in the project area and at the disposal site. Benthic (bottom-dwelling) organisms would be temporarily affected by the removal of Bay muds, which serve as benthic habitat, and by sedimentation. Organisms would be expected to recolonize dredged areas in a few days to a year. Spawning herring could be affected by the dredging if it occurred during December through March.

The proposed project would add to the impacts caused by the cumulative disposal of other Bay Area dredging projects. The Army Corps of Engineers is currently evaluating the cumulative impacts of Bay Area dredge spoil disposal. An evaluation of cumulative impacts is not possible without the results of the Corps' long-term studies expected to be completed in 1990. It is expected that the Corps would take cumulative effects into account during the permit review process.

Mitigation Measures

The Port would use dredging techniques which minimize turbidity. The Port is currently involved in sedimentation studies which are expected to result in new strategies to decrease sedimentation along the San Francisco Port shoreline. Dredge spoils would be disposed of during ebb tide (when the tide recedes) in order to maximize sediment dispersion oceanward.

The Port would consult the California Department of Fish and Game on the scheduling of dredging to minimize impacts on the spawning of herring.

Alternatives

The No-Project Alternative would continue navigational conditions which limit the access options of deep draft vessels berthing at SFCT-South. Dredging of one (the southernmost) rather than two new channels would provide improved conditions for turning from the existing channel, which lines up with Islais Creek, to the SFCT-South but would not provide the navigational choice between two access channels from the north to SFCT-South. The approach from the north is used more often than the approach from the south. Tidal constraints would continue to affect the timing of berthing. Dredging a third new channel to the north of the SFCT would improve access for deep draft vessels approaching and leaving the SFCT from the north. Total dredge spoils generated by this alternative would more than double the amount of spoils generated by the proposed project. This alternative was discarded by the Port.

SUMMARY NOTE

1. MLLW: mean lower low water. The average of the two low tides along coasts like California where the two daily low tides are unequal.

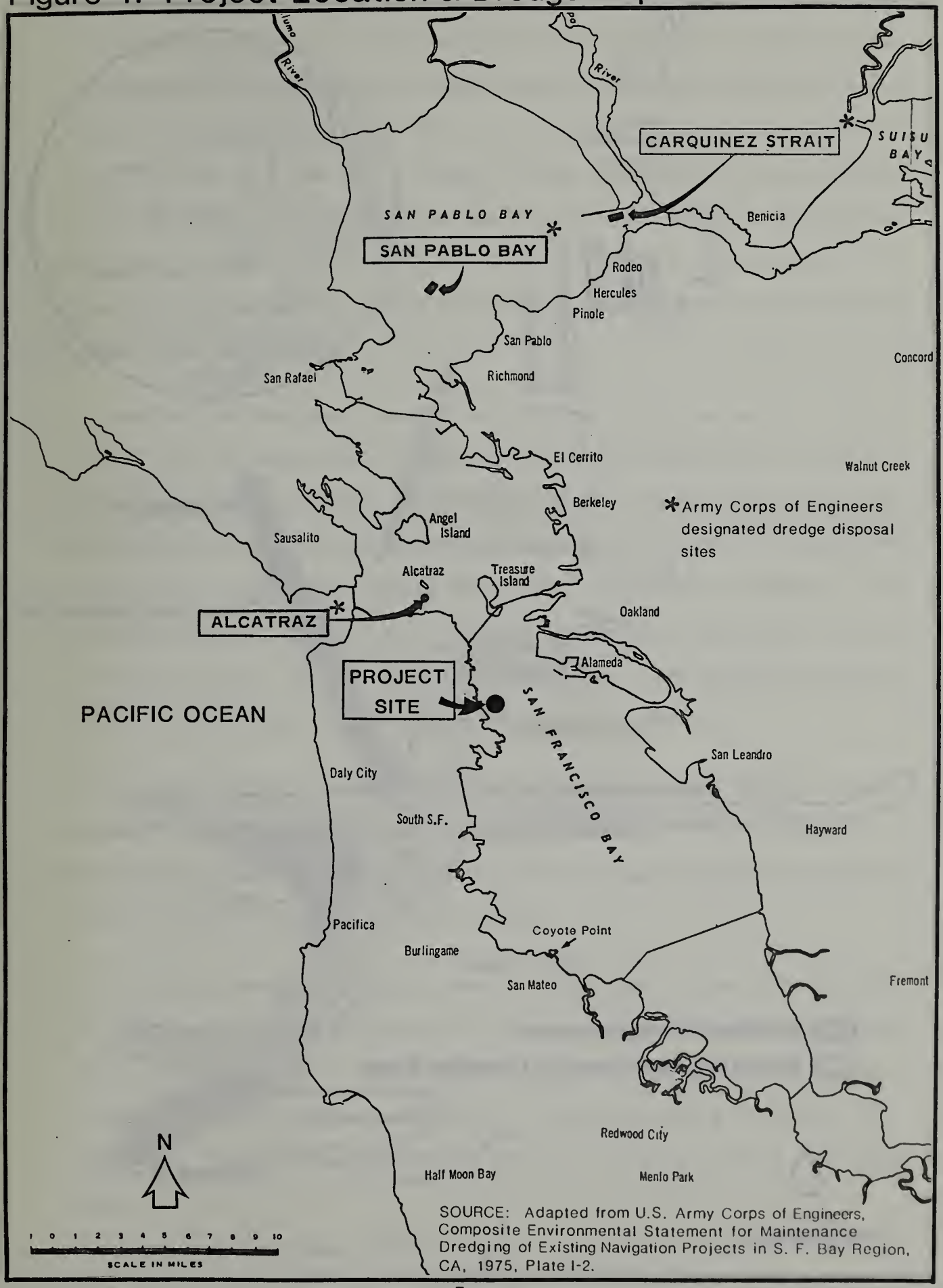
CHAPTER III. PROJECT DESCRIPTION

The Port of San Francisco proposes the dredging of two new channels and the dredging of a third area adjacent to an existing channel in San Francisco Bay to a maximum depth of -40 feet to allow for better angles of approach and departure of deep-draft vessels to the San Francisco Container Terminal (SFCT). The proposed channels would be additions to existing maintenance-dredged channels immediately offshore of the San Francisco Container Terminal-North and -South, an area of San Francisco's Southern Waterfront which is dominated by maritime and industrial activities (see Fig. 1, p. 7 and Fig. 2, p. 8). The changes would not affect the maximum draft[1] limitations of vessels that can berth at the SFCT.

Proposed Channel A (See Fig. 2, p. 8) would cover approximately 36 acres of the Bay floor and would extend about 1500 yards to the north-northeast from Pier 94. Proposed Channel B would cover approximately 19 acres, and would extend about 650 yards to the east from Pier 96. The existing south channel may be abandoned after the dredging of Channel B. Proposed Area C would add about 21 acres to an existing maintenance-dredged channel which lines up with Islais Creek.

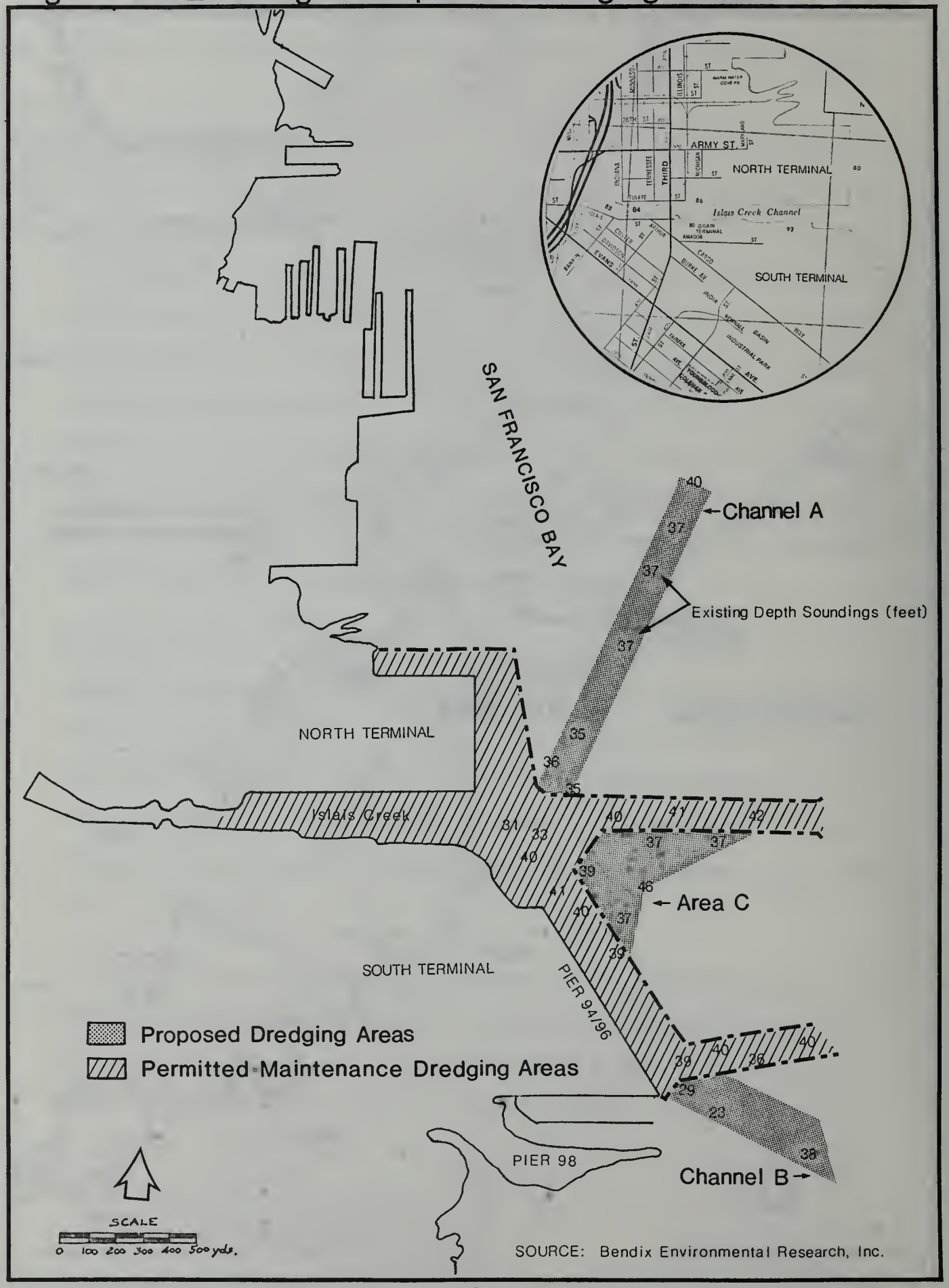
The Port would use both the clamshell dredge and the hopper dredge methods. Clamshell dredging involves dropping a hinged "bucket" through the water and working it into the sediment. The bucket is then raised and the sediment is dumped into a barge which carries the material to the disposal site. Hopper dredging involves removal of sediment by scraping the Bay bottom and sucking the sediment through pipes known as drag pipes. The dredged mate-

Figure 1. Project Location & Dredge Disposal Sites



SOURCE: Adapted from U.S. Army Corps of Engineers, Composite Environmental Statement for Maintenance Dredging of Existing Navigation Projects in S. F. Bay Region, CA, 1975, Plate I-2.

Figure 2. Existing & Proposed Dredging Areas



rial is pumped into bins on the dredging barge, from which it can be discharged at the disposal site. Hopper dredging results in less turbidity than clamshell dredging, but it can only be used when the area to be dredged is long enough to allow for the hopper dredge to move for long stretches in one direction with minimum time used in turning. The Port proposes to use hopper dredging for Channel A. Clamshell dredging must be used for Areas B and C because the lengths of the areas are inadequate for efficient hopper dredge movements.

The deepened and realigned channels would improve safety and ease of access to SFCT-South by vessels with a capacity of 2700 TEU (twenty-foot container equivalent unit) and a draft of 38 feet at MLLW. The SFCT FEIR indicated that vessels of this size were to be accommodated by the facility (see SFCT FEIR, p. 40). The depths of the SFCT berths would not be changed. The proposed project is not intended to provide for access of any vessels larger than those covered by the SFCT FEIR evaluation. The proposed dredging would not permit berthing of an increased number of vessels.

The proposed project is not related to the Navy's proposed homeporting at Hunters Point. The channels which would be dredged near the SFCT would not be used by the Navy for access to Hunters Point because they do not provide a useful route of approach to Hunters Point.

As increasing numbers of larger container ships come to the SFCT, concern has increased about the efficiency of access and margin of safety for large (38 foot draft) vessels. The present configurations of the east-west channels require sharp turning movements for vessels entering or leaving the SFCT-South. The larger the ship, the greater the space required for these turns.

Vessels must turn against the prevailing cross-currents in order to align with the berth upon entering the SFCT-South or with the channel upon exiting. The berthing of larger vessels is often delayed to take advantage of high tide and slack water[2] conditions which provide greater maneuvering area and vessel safety at adequate depth. Such delays are a cost shippers wish to avoid. The change of ingress/egress configuration afforded by the proposed dredging would expedite vessel movement and increase access/egress options from the north (by adding new Channel A and widening the existing east-west channel) and the south (by adding Channel B).

Average existing depths in the areas to be dredged range from 25 to 40 ft. It is estimated by Port engineers that one-time dredging to a design depth of 40 ft. would involve the removal of approximately 1,400,000 cubic yards of sediments. This sediment volume estimate is based on dredging to 42 ft. to take into account the Corps' allowable 2 ft. overdredge margin (dredging 2 ft. deeper than the proposed depth).

Maintenance dredging permit #13296-48, issued January 14, 1981 by the Army Corps of Engineers to the Port of San Francisco, provides for an annual maintenance dredge spoils volume of 400,000 cubic feet per year. BCDC maintenance dredging permit #36-71, as amended March 12, 1985, allows the Port to dredge up to 500,000[3] cubic feet per year to a depth of 40 ft. in existing shipping channels and berthing areas near the SFCT. The proposed areas to be dredged would connect to existing berthing areas but are not included in the existing maintenance dredging permits. They would be dredged to the same depth as the area covered by the existing maintenance permits.

Permits to dredge and to dispose of dredge spoils would be required from the Army Corps of Engineers (Corps) and the Bay Conservation and Development Commission (BCDC). An application for a permit to dredge has been filed with BCDC. A Corps permit application will be filed in December 1986. Dredge spoils would be deposited at a site approved by the Corps and BCDC. A Water Quality Certification assuring that the project would not violate water quality standards would be obtained from the Regional Water Quality Control Board (RWQCB). It is estimated that the proposed dredging would be completed in about twelve weeks at a project cost of $2.3 million.

PROJECT DESCRIPTION NOTES

1. Draft: the depth below the water surface of the lowest part of a vessel, especially when loaded.

2. Slack water: the period at the turn of the tide when there is little or no horizontal motion of tidal water.

3. Port dredging permits have varied from 250,000 to 500,000 cubic yards at various times and the Corps and BCDC permit renewals are not on the same schedule so that they do not always match in amount. Jim Read, Materials Engineer, Port of San Francisco, telephone conversation of August 25, 1986.

CHAPTER IV. ENVIRONMENTAL SETTING

Existing Sediment Characteristics

In 1977 the Corps dredged the area near the SFCT to a depth of 40 ft. and deposited the dredge spoils at the Alcatraz site. The Port has handled maintenance dredging since then. The proposed dredging is expected to result in sediments similar to those covered by current maintenance dredging permits and deposited at the Alcatraz site. Areas to be maintenance dredged are sampled each year and tested for suitability for Alcatraz disposal. These sediments have always been found suitable to go to the Alcatraz site.[1]

Groundwater Resources

Water-bearing geological formations (aquifers) extend under the Bay from adjacent land areas. These fresh water reservoirs are protected from salt water intrusion by a covering of Bay mud. Younger Bay Mud in the project area is believed to range from 60 to 100 feet in thickness, with average depth to bedrock ranging from 200 to 300 feet.[2] The younger Bay Mud is saturated with salty Bay water and would not contain fresh water bearing formations.

Dredge Spoil Disposal

Prior to 1972, sediment from Bay Area dredging activities was deposited at eleven disposal sites approved by the Corps. In response to the Clean Water Act legislation of 1972 and the results of a three and a half year

dredge disposal study initiated by the Corps in 1972, certain disposal sites were eliminated due to lack of adequate dredge material dispersion or other environmental factors.

There are presently three Bay disposal sites designated by the Corps as suitable for dredged material disposal, see Fig. 1, p. 7, and one ocean disposal site three miles outside the Golden Gate, used only for spoils from dredging the San Francisco Bar west of the Golden Gate Bridge. About 2 million cubic yards of spoils are deposited annually at the Carquinez Strait site (south of the Carquinez Strait Bridge). About 250,000 cubic yards of sediment are deposited at a site north of the Richmond-San Rafael Bridge, in San Pablo Bay. The average volume of dredge spoils deposited at Alcatraz annually has been about 4.5 to 5 million cubic yards (averages are based on 1965 to 1985 disposal data), but has doubled to about 10 million cubic yards per year in the last two years as a result of the Baldwin Ship Channel dredging project which began in 1984.[3]

The Alcatraz site is characterized as a "deep, high energy area."[4] Dispersion of unconsolidated sediments, such as Bay muds, typically occurs within several minutes of disposal. Although the site is characterized by strong currents and scouring of the bottom, deposited sediments have accumulated on the eastern half of the site, apparently as a result of unauthorized dumping of concrete debris. The Corps has had to dredge the sediment mound in recent years to maintain safe vessel movement conditions in the area.

The Corps has not yet determined the site to be used for disposal of project dredge spoils. Because the heavily used Alcatraz disposal site is reaching capacity, the Corps is currently examining alternative sites in San Fran-

cisco Bay and outside the Golden Gate, in deep water, to accommodate future dredge spoils disposal.

In 1985 the Corps began additional studies addressing issues associated with dredge disposal in San Francisco Bay. These studies include bioassay testing to determine the effects of sediments on marine organisms, assessment of alternate disposal sites, and sedimentation studies. As a result of these studies, the Corps plans to adopt management policies for dredge disposal in the Bay Area. The Corps expects to release the draft management policies in late September 1986.[5]

The Corps' considerations for alternate disposal sites include: land disposal alternatives review, assessment of South Bay and Ocean disposal sites, examination of possible reuse of sand contained in spoils (to reduce total spoils volume), and reduction of federal maintenance dredging requirements for several Bay sites. The Corps' notice of intent to prepare a Draft Environmental Impact Statement for Ocean Disposal Site Designation off San Francisco Bay was published in the Federal Register of July 31, 1986.

The Alcatraz site was closed from approximately July 3 to August 1, 1986, while the Corps monitored a single dredge disposal operation to determine the effects of disposal of non-dispersive material, such as sand and consolidated clays, at the "Alcatraz Annex," a site 300 feet east of the existing Alcatraz site. The Corps is investigating this annex as a potential interim disposal site until designation of a permanent disposal site is made. An environmental impact statement (EIS) on this interim use is currently being prepared. It is expected to be published in draft form in March 1987. Results of the one-month test, not expected to be available before January

1987,[5] will be used for modeling studies to be performed at the Corps' Waterway Experiment Station, Vicksburg, MS.

If the Corps decides to authorize a new disposal site, it will do environmental review for this action. BCDC reserves the right of independent approval of San Francisco Bay spoils disposal sites. The Coastal Commission would review ocean disposal sites within three miles of the California coastline. The Corps expects to complete its Alcatraz sedimentation studies in two years and its complete Bay sedimentation studies in about four years.

Marine Biology

Benthic organisms, such as snails, shellfish, worms and crabs, live in the bottom sediments of the Bay, which constitute a productive habitat and food source for bottom feeding species. Open waters in the project area support phyto- and zoo-plankton (microscopic plants and animals) and free swimming animals, such as shrimp and various fish species. Marine mammals, such as sea lions, harbor seals and porpoises, are found in the Bay but are not known to use the proposed project area.[6]

Herring are known to occur and spawn in project area waters. The spawning season is from late November through mid-March; eggs are attached to objects such as piles, aquatic vegetation and rocks.[7] Regular daily surveys of herring activity in the San Francisco Bay conducted by the California Department of Fish and Game since 1973 indicate that, from 1979 to 1982, herring favored subtidal (below low tide mark) areas of the Bay for spawning. Since 1982 the pier pilings in the intertidal (partially exposed at low tide) areas of the Bay, specifically pilings along the southern

waterfront between Treasure Island and Coyote Point, have become the major herring spawning areas in the Bay.[8]

Refer to the SFCT FEIR, pp. 42 to 44, for further discussion of Marine Biology, including threatened and endangered species.

Plans and Policies Relevant to the Proposed Project

The relationship between the SFCT modernization, and the Comprehensive Plan of the City and County of San Francisco, is discussed in the SFCT FEIR, Appendix A, pp. A-11 to A-14. The proposed dredging would not affect this discussion.

Policies of the 1979 BCDC Bay Plan relevant to the proposed dredging include: Policy 2, "Vigorous efforts should be made to find methods of spoils disposal that will provide for construction of vitally needed shipping channels." (Bay Plan, p. 15). The proposed project would provide improvement of an existing ship channel and two new shipping channels improving access/egress from the SFCT.

Dredging Policy 6 (Bay Plan, p. 16) states: "To protect underground fresh water reservoirs, all proposals that could penetrate the mud "cover" should be reviewed by the Regional Water Quality Control Board and the State Department of Water Resources." The proposed project would not affect a fresh water aquifer, but the draft SEIR would be reviewed by the RWQCB.

The San Francisco Bay Area Seaport Plan, adopted by the Metropolitan Transportation Commission (MTC) and the BCDC in 1982, found that "Some improvements to the deepwater channel system in the Bay Area will probably be required to economically accommodate vessels of the future." (Seaport Plan,

p. 18). The Deepwater Channels Policies of the Seaport Plan state that "deepening or widening of San Francisco Bay Channels...should proceed only if economically justified" (Seaport Plan, p. 24) and that projects shall be "consistent with BCDC's Bay Plan policies" (Seaport Plan, p. 25).

The RWQCB adopted the Water Quality Control Plan-San Francisco Bay Basin (Basin Plan) in 1975 and approved amendments to the Basin Plan in 1982. The RWQCB is currently reviewing the Basin Plan for further amendments. The Board is considering individual amendments as they are developed by staff.

The proposed project relates to several Objectives and Policies of the existing Basin Plan.

The Basin Plan Objectives for Suspended Material and Sediment state that "Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses" and that "suspended sediment load...shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses" (Basin Plan, p. 3-3).

The Basin Plan Objective for Toxicity states that "waters shall be maintained free of toxic substances...in concentrations that are toxic to... human, plant, animal, or aquatic life" (Basin Plan, p. 3-5). The RWQCB is currently considering revisions to this Objective, including revised objectives for metal concentrations in effluent discharged to surface waters of the Basin.

The existing Basin Plan Dredging Policy (Basin Plan, p. 5-5) indicates the regulatory authority of the Army Corps of Engineers over dredging activities. Resolution No. 80-10, adopted by the RWQCB in 1980, gave the Ex-

ecutive Officer of the RWQCB discretion regarding additional water quality and sediment testing requirements as well as dredged sediment disposal impact monitoring.

A draft amendment concerning dredging policy was released on August 29, 1986. The policy states that for all new dredging proposals, the Board will require: (1) analyses of the sediments to be dredged for: arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, silver, tributyltin, zinc, polyaromatic hydrocarbons, and pesticides (pesticides by EPA method 608); (2) bioassays as specified by the Board; and (3) identification of the cost of ocean disposal compared to the proposed disposal option.[9]

The Board has not specified when this proposed policy will be adopted. In reviewing the draft SEIR, the Board will therefore determine the extent to which these policies should be addressed.[10]

Refer to the SFCT FEIR, pp. 52-63, for further discussion of plans and policies relevant to modernization of the SFCT.

SETTING NOTES:

1. Jim Read, Materials Engineer, Port of San Francisco, telephone conversation, August 1, 1986.

2. California Division of Mines and Geology, Geologic and Engineering Aspects of San Francisco Bay Fill, Special Report 97, 1969, Plates 2 and 4.

3. Alan R. Pendleton, Executive Director, BCDC, memo to All Commissioners and Alternates, Background Information on the Accumulation of Dredge Spoils at the United States Army Corps of Engineers' Alcatraz Disposal Site, July 2, 1986, for Commission Consideration July 17, 1986. Available for public review in the project file at the Department of City Planning, 450 McAllister Street, San Francisco, CA 94102, and Lester Tong, Army Corps of Engineers, San Francisco District, telephone conversation with SEIR Consultant, July 2, 1986. The Baldwin Ship Channel

runs from San Francisco Bay to Stockton and is being built by the Army Corps of Engineers.

4. Final Interim Design Memorandum No. 5 and Environmental Impact Statement, John F. Baldwin Ship Channel, Phase II, Richmond Harbor Approach, May 1984, p. 20, US Army Corps of Engineers, San Francisco Division.

5. Lester Tong, Army Corps of Engineers, San Francisco District, telephone conversation with SEIR Consultant, July 10, 1986.

6. Holton Associates, report of July 17, 1985, available for public review in the SFCT EIR file, 85.123E, at the Office of Environmetal Review, Department of City Planning, 450 McAllister St.

7. Robert Tasto, California Department of Fish & Game, telephone conversation with Steve Granholm, Holton Associates, SEIR Subconsultant, July 29, 1986.

8. Spratt, Jerome D., "Biomass Estimates of Pacific Herring, Culpea Harengus Pallasi, in California from the 1984-85 Spawning Ground Surveys," Marine Resources Administrative Report 85-2, CA Department of Fish and Game, 1985.

9. RWQCB, Basin Plan Review, Second Draft, August 29, 1986, p. 4-32A.

10. Steve Ritchie, Regional Water Quality Control Board Staff, San Francisco Bay Region, telephone conversations with EIR Consultant, July 18, August 25 and September 5, 1986.

CHAPTER V. IMPACTS

Dredge Spoil Disposal

The proposed dredging of 1.4 million cubic yards would constitute about 30% of the past average annual volume deposited at the Alcatraz site and about 15% of the current annual volume deposited at the Alcatraz site. This would be about 5.6 times the average annual volume of Port maintenance dredging of 250,000 cubic yards (average based on 1975 to 1985 maintenance dredging) and 2.8 times the presently permitted maintenance dredging of 500,000 cubic yards.

The proposed project would result in an increase in annual Port maintenance dredge spoil volume. The total increase in maintenance dredging area would be about 76 acres. It is not known by how much annual maintenance dredging volume would increase. Because the increased area subject to maintenance dredging is less than 55% of the area now subject to maintenance dredging (140 acres), the increase in dredge spoils from future maintenance dredging in this area would be expected to be less than 55%. The total area at the Port subject to maintenance dredging would be about 0.2 square miles or 0.04% of the water area of the Bay.

Dredged material would be disposed of in compliance with applicable regulations of the Army Corps of Engineers and BCDC.

Increased dredging by the Port of San Francisco may affect the time when the present Alcatraz site reaches capacity. As of 1977, it was believed that no accumulation of sediments was taking place at Bay disposal sites.[1]

In 1982 the Corps discovered that sediments were accumulating on the eastern half of the Alcatraz site and disposal was restricted to the western half.[2] Disposal of dredge spoils from the proposed project could add to accumulation at the Alcatraz site.

Results of Corps studies of the Alcatraz site are not yet available and it is not known what action the Corps will take with respect to dredge disposal sites. If the sediments to be dredged in the proposed project are found to be polluted, they could not be deposited at the Alcatraz dredge disposal site and land disposal at a Class II or Class I hazardous waste (as defined in Title 23 of the California Administrative Code) solid waste disposal site would be necessary. The higher cost of land disposal could lead to reduction of the amount of proposed dredging or to a decision not to dredge.

Sediment Evaluation

As part of its dredging and dredge spoils disposal permitting process pursuant to § 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and § 404 of the Clean Water Act (33 U.S.C. 1344), the Army Corps of Engineers has requested evaluation of the sediments proposed for dredging. Chemically contaminated sediments may not be deposited at the Alcatraz site or other Bay dredge spoil disposal sites.

The Corps requires use of the elutriate[3] test to evaluate sediments. Sixteen samples distributed over the area of proposed dredging were subjected to the elutriate test using water from the proposed Alcatraz disposal site.[4] Oil and grease, petroleum hydrocarbons, cadmium, lead, mercury, polychlorinated biphenyls (PCBs) and chlorinated pesticides were below detection limits[5] in all samples. This material, therefore, would be expected to meet the Corps' criteria for disposal at the Alcatraz site.

The elutriate test does not detect water-insoluble substances on particulates suspended in the water which may be ingested by marine organisms. These substances may accumulate to toxic levels in fat deposits of these organisms. To address this concern and to address concern expressed by the State Water Resources Control Board that the elutriate test overlooks many toxic synthetic organic chemicals,[6] chemical analyses of the sediments themselves were also performed. Cadmium, PCBs, chlorinated pesticides, oil and grease and petroleum hydrocarbons were below their respective thresholds of detection in all samples.[7] The results of analyses of detectable substances are presented in Table 1, page 23.

Lead averaged 12 mg/kg, with a range of 6 to 17 mg/kg. This is less than the minimum of 18 mg/kg in the North Bay recently obtained by NOAA (the National Oceanic and Atmospheric Administration).[8] (The limited sampling of the NOAA study found the North Bay to be the least contaminated area of the San Francisco Bay.) Mercury at the project site averaged 0.09 mg/kg, with a range of 0.04 to 0.19 mg/kg, as compared to the minimum recently observed North Bay value of 0.09 mg/kg[8] and an Islais Creek sediment range of 0.2 to 1.2 mg/kg (the higher levels found in Islais Creek are at the threshold of having biological effects[9]). Zinc averaged 51 mg/kg, with a range of 39 to 71 mg/kg, as compared to the lowest recently observed North Bay value of 86 mg/kg. The lead and zinc levels found in the project area are lower than the levels found near Hunters Point of 46 - 65 mg/kg lead and 140 - 200 mg/kg zinc.[10]

The sediments were analyzed for all the substances called for in the draft amendments to the Basin Plan except tributyltin.[11] Pesticides were analyzed according to EPA method 8080 rather than the EPA Method 608 called for in

Table 1. Lead, Mercury and Zinc Content of Sediments to be Dredged.[1]

LEAD mg/kg[2]			MERCURY mg/kg			ZINC mg/kg		
Sediment Ave. (Range)[3]	Islais Creek (Range)	NOAA Lowest SF Bay[4]	Sediment Ave. (Range)[3]	Islais Creek (Range)	NOAA Lowest SF Bay[4]	Sediment Ave. (Range)[3]	Islais Creek (Range)	NOAA Lowest SF Bay[4]
12	129[4]		0.09[4]	0.71[4]		51	234[4]	
(6-17)	(49-223)[4]	18	(0.04-0.19)[4]	(0.37-1.20)[4]	0.09	(39-71)[4]	(156-321)[4]	86
	(41-882)[5]			(0.2-1.2)[5]			(95-194)[5]	

1. Cadmium was below the detection level in 16 samples. Oil and grease and petroleum hydrocarbons were below the detection level in the 8 samples analyzed. PCBs and chlorinated pesticides were analyzed in samples 12, 16, 20, and 24, and were below detection limits.
2. mg/kg = milligrams per kilogram of sediment (dry weight).
3. Sediment analyses performed by Thermo Analytical Laboratories (formerly EAL). EPA method 8080 used for pesticides.
4. Chapman, P.M., Dexter, R.N., Cross, S.F. and Mitchell, D.G., "A Field Trial of the Sediment Quality Triad in San Francisco Bay," NOAA (National Oceanic and Atmospheric Administration), March 1986, Appendix page 36. Lower values have been reported in Spies, Robert B. et al., "Toxic Chemicals in Bay Sediments and Fish," a report prepared for the Regional Water Quality Control Board, July 1985. As explained on p. 10 of that report, the atypical total organic carbon content of the Alameda sediment samples makes it difficult to compare these samples to sediments from other parts of the Bay. Normalization of the values in that study (p. 13) showed the Alameda samples to actually be highest for some chemicals. Data on which to base normalization calculations for the samples in this study were not available.
5. Range of values from samples collected April 20, 1982, given in letter of James Salerno, Water Quality Chemist, Bureau of Water Pollution Control, San Francisco Department of Public Works, April 10, 1985, to Dr. Selina Bendix, Bendix Envrionmental Research, Inc., EIR consultant, and Hofman, Roderick W. and Meighan, Richard B., "The Impact of Combined Sewer Overflows From San Francisco on the Western Shore of Central San Francisco Bay," Journal Water Pollution Control Federation 56:1277-1287, 1984, both as cited in the San Francisco Container Terminal Modernization FEIR, 85.123E, SCH 85062513, January 1986. pp A-27 to A-28.

Source: Bendix Environmental Research, Inc.

the draft Basin Plan amendments. Bioassays were not performed. The last topic covered by proposed Basin Plan amendments, the comparative costs of ocean disposal to the proposed Bay site disposal option, is not discussed in the SEIR.

There is no reason to expect biological effects from the levels of lead, mercury and zinc found in these sediments, and it is expected that permits would be issued for deposition of such sediments at the Alcatraz disposal site if space is available.

Water Quality/Public Health Hazard

Sediment displacement from dredging activities could expose marine life to any toxic pollutants which were previously trapped in lower sediment layers. Heavy metals, such as mercury and lead, may be present in Bay muds and would be resuspended in the water column as a result of dredging/disposal activities. Toxic organic materials could be present in the sediments. If any such toxic materials were present and were dispersed into the water it could affect plants and animals in the Bay and, ultimately, human beings.

The chemical analyses of the sediments presented in the previous subsection indicate that no ecological or public health hazard would be associated with the proposed dredging. Because the sediments are uncontaminated, any changes in water flow on the bottom of the Bay due to the dredging would not stir up toxic material into the water column.

Biological Impacts

The habitat of benthic organisms which reside in the Bay muds would be temporarily affected by the removal of bottom sediments. However, this would

not substantially diminish habitat for benthic organisms in relation to total benthic habitat available in the project vicinity, and recolonization of the dredged areas would be expected to occur. Recolonization is most rapid in well-oxygenated areas,[1] such as the east-west channel adjacent to proposed dredging Area C; this channel is subject to active tidal flushing. The newly dredged areas would become similar to the presently dredged areas in one to five years, except that where the greatest depth changes occur (no more than 17 ft.), the species distribution may be affected.

Deposition of resuspended sediments could affect benthic habitat elsewhere in the Bay through siltation of bottom surfaces used by organisms for breeding or protection. All but the finest sediments would be expected to settle out within a day after completion of the twelve weeks of dredging.

Adult herring spawn in the Bay in the vicinity of the project area and then leave the Bay for the ocean. (The young may remain in the Bay through their first year, but most leave the Bay by October.) From late November to mid-March the eggs, which are attached to submerged objects, are vulnerable to siltation, which usually results from dredging. Since the herring eggs are attached to solid objects which are not present in the shipping channels, the main potential effect would be smothering of eggs near the channels by sediments. The nearest attachment points would be the wharf pilings.

It is expected that turbidity and effects on adult fish in the water would be reversed in a matter of days after dredging. If any herring eggs were to be present during dredging they could be killed by settling sediment and the number of herring surviving for the year in the Bay could be affected.

The California Department of Fish and Game (DFG) is generally concerned that dredging may have a negative impact on reproductive success of herring (SFCT FEIR, page 109). In the past, DFG has not placed timing conditions on S.F. Port dredging.[12] This indicates that significant impacts were not anticipated for such dredging in the past.

The spawning of herring along the Southern Waterfront has been increasing, particularly since 1982,[13] thus increasing potential dredging impacts upon spawning fish. The project sponsor would consult with the California Department of Fish and Game before setting the time for dredging.

The proposed project would not have any effects on endangered species (see SFCT FEIR pp. 108 to 110).

Groundwater Resources

Since Bay muds overlying any fresh water aquifers in the project area are 60 to 100 feet thick and natural deep water areas within 350 yards of the channels to be dredged are 40 to 45 feet deep, suggesting that any fresh water aquifers are even deeper, it is improbable that fresh water aquifers would be affected by the proposed dredging. The Corps would require the project sponsor to obtain a Water Quality Certification from the Regional Water Quality Control Board (RWQCB) to assure that the project would not result in a violation of water quality standards. The RWQCB would require further investigation if they determine that the proposed project may interfere with fresh water aquifers.[14]

Cumulative Impacts of Other Bay Area Dredging Activities

About 12,250,000 cubic yards of sediments are now dredged from San Francisco Bay annually. Results of The Corps' 1972 dredge disposal study indicated that dredging operations and material disposal result in localized short-term effects such as dissolved oxygen reduction, increased turbidity, and release of toxic substances into the water column.[15] The Corps will evaluate the effects of cumulative dumping in San Francisco Bay as part of the permit review process for the proposed Port dredging.[16] The Corps expects existing disposal sites to be able to accommodate projected future spoils disposal until it completes on-going disposal studies and makes decisions concerning additional disposal sites.

Approximate projected disposal volumes for San Francisco Bay for ongoing maintenance dredging, ongoing projects and anticipated new projects, are 7.9 million cubic yards for Fiscal Year (FY, October through September) 1986, 6.2 million cubic yards for FY 1987, and 7.6 million cubic yards for FY 1988. Volumes for FY 1989 could range from 10 to 17.6 million cubic yards. The low end of that range assumes no new dredging at Richmond Harbor and 0.2 million cubic yards as part of the Navy's proposed homeporting project. The high end of that range assumes 2.2 million cubic yards of new dredging at Richmond Harbor and 5.6 million cubic yards as part of the Navy's proposed homeporting of the Missouri. These figures do not include the proposed SFCT dredging. If necessary, the Corps will implement scheduling constraints to limit annual disposal amounts at Alcatraz.[2] The proposed dredging at the SFCT would represent approximately 15% of the average annual dredging volume for approved or ongoing projects which would be expected to use the Alcatraz site from now through 1989.

Issues Focused Out of the SEIR

The proposed project would not require any variances, special authorizations, or changes to the City Planning Code or Zoning Map.

The proposed project would not have any impacts on land use not covered by the SFCT FEIR discussion on pp. 65 to 66.

Dredging activities would be visible from various Bay vantage points for the estimated project time of twelve weeks. The project would not contribute to any other visual impacts not covered in the SFCT FEIR, pp. 66 to 67. Work crews associated with the dredging activities would be employed for twelve weeks. The project would not create any other job or population impacts not covered in the SFCT FEIR, Appendix A, pp. A-16 to A-17.

The SFCT FEIR contains an analysis of traffic and parking impacts expected to be generated by the modernization of the container terminal. The analysis included assumptions concerning predicted container cargo arriving at the SFCT based on cargo vessels with the capacity of those expected to access Port facilities as a result of the proposed dredging. The size of vessels berthing at the SFCT determines maximum traffic generation. Therefore, the project would not result in increased traffic or parking demand which has not already been analyzed in the SFCT FEIR (pages 67 to 94).

The proposed project would improve existing marine transportation systems by provision of two new channels and changing the configuration of an existing ship channel, thereby improving access and egress at the SFCT under all tidal and current conditions.

Noise associated with dredging activities could intermittently exceed ambient noise levels of 60-65 L_{dn} in the site vicinity at Pier 94/96. This increase would be temporary (twelve weeks) and would not expose sensitive receptors, such as inhabitants of residential areas, to noise levels beyond those discussed in the SFCT FEIR on page 66.

Air quality impacts associated with increased container vessel traffic were analyzed in the SFCT FEIR on pp. 100 to 108. The proposed dredging project would not increase the draft of container vessels capable of accessing the Port's facilities; it would improve access for ships currently calling at the Port, which could decrease air pollution production by decreasing ship maneuvering time. Operation of dredging equipment would temporarily (twelve weeks) contribute to a localized degradation of air quality which is not expected to exceed ambient air quality standards. No hydrogen sulfide odor (rotten egg odor) was detected in handling sediment samples and no such odors are expected to be released by the dredging operation.

The proposed project would not alter wind, moisture or temperature patterns in the vicinity.

The project would not have any impacts on schools, recreational facilities, or utilities other than those covered in the SFCT FEIR on page 66.

The project would locally alter Bay floor contours because of the removal of bottom sediments. It would not have any geologic impacts not covered in the SFCT FEIR, Appendix A, pp. A-25 to A-26.

Dredging activities would consume fuel for twelve weeks. After completion of the project there would be a slight increase in energy efficiency of

vessel operation because of improved berth access and decreased maneuvering time.

Dredging-associated fuel consumption would be negligible compared to fuel used by vessels berthing at the SFCT. The project would not involve any substantial energy/natural resources impacts other than those discussed in the SFCT FEIR, Appendix A, p. A-29.

No known cultural resources exist at the project site.[17] Since the dredging would take place offshore of Pier 94/96, in an area that has not been filled, it is improbable that archaeological resources would be encountered.

Dredging activities would result in temporary turbidity of surrounding Bay waters which could interfere with any ongoing scientific research in the project vicinity. On-going Port sponsored sedimentation studies would not be expected to be affected.[18] The Port would probably monitor waters in the project vicinity during the dredging as a part of ongoing sedimentation studies. The extent of other research in the area is not known. This impact is not expected to be significant because of the limited area and duration of the project.

IMPACTS NOTES:

1. DiSalvo, Louis H., Environmental Effects of Dredging and Disposal in the San Francisco Bay Estuarine System, Draft Final Report to ABAG, 1977.

2. Lt. Col. Andrew Perkins, District Engineer, Army Corps of Engineers, San Francisco District, presentation to Bay Conservation and Development Commission, July 17, 1986; other Corps sources; and Alan R. Pendleton, Executive Director, BCDC, Background Information on the Accumulation of Dredge Spoils at the United States Army Corps of Engineers' Alcatraz Disposal Site, memo to All Commissioners and Alternates, August 22, 1986, available for public review in the case file at the Department of City Planning.

3. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredged and Fill Material, Ecological Evaluation of

Proposed Discharge of Dredged Material Into Ocean Waters, Appendix C, July, 1977. The elutriate test required by the Corps simulates the interaction of the disposed sediment with the water column at the disposal site and the disposal site bottom. The Corps requires that sediment samples from the area to be dredged be mixed with water from the proposed disposal site. The sediment/water slurry is physically mixed for 30 minutes under oxygenated conditions (compressed air bubbled through the slurry). After mixing, the liquid fraction is analyzed for contaminants. It is assumed that contaminants tightly bound to the sediment would not be released into the water column and would not be available to organisms. This assumption may not be valid under some conditions.

4. Elutriate testing was performed by Thermo Analytical Laboratories (formerly EAL), an Environmental Protection Agency certified hazardous waste analysis laboratory. Detailed results available for public review in the case file at the Department of City Planning.

5. The detection limits were: oil and grease < 5 milligrams per kilogram (< means less than), petroleum hydrocarbons < 5 mg/kg, cadmium < 0.005 mg/kg, lead < 0.02 mg/kg, mercury < 0.002 mg/kg, PCBs < 0.002 mg/kg, and chlorinated pesticides < 0.001 mg/kg.

6. Anton, Edward C., Chief, Program and Investigations, Division of Water Quality, State Water Resources Control Board, memorandum to Roger B. James, Executive Officer, San Francisco Bay Regional Water Quality Control Board, February 5, 1986, available for public review in the case file at the Department of City Planning.

7. The detection limits were: cadmium < 1 mg/kg, PCBs < 1 mg/kg, chlorinated pesticides < 1 mg/kg, oil and grease < 420 mg/kg, and petroleum hydrocarbons < 420 mg/kg.

8. Chapman, P.M., Dexter, R.N., Cross, S.F. and Mitchell, D.G., "A Field Trial of the Sediment Quality Triad in San Francisco Bay," NOAA (National Oceanic and Atmospheric Administration), March 1986, Appendix page 36.

9. Chapman, et al., op. cit., p. viii.

10. Spiers, Albert H. et al., Initial Assessment Study of Hunters Point Naval Shipyard (Disestablished), San Francisco, California, Naval Energy and Environmental Support Activity, Port Hueneme California, NEESA 13-059, October 1984, page 8-7.

11. According to several California Department of Health Services certified laboratories, there is no standard method of analysis for tributyltin and they have never analyzed for this compound (telephone conversations with George Dunstan, Manager, Hazardous Waste Program, ThermoAnalytical Laboratories, and Steve Leung, Laboratory Director, Eureka Laboratories, September 10, 1986). Under these circumstances, it is possible that analysis for elemental tin will be substituted for analysis for tributyltin until a method is standardized for the latter.

12. Vello Kiisk, Chief Engineer, Port of San Francisco, telephone conversation, July 18, 1986.

13. Granholm, Steve, Holton Associates, memo of August 21 1986.

14. Dr. Teng Wu, Municipal Division Chief, Regional Water Quality Control Board, San Francisco Bay Region, telephone conversation with EIR Consultant, July 2, 1986.

15. Regional Water Quality Control Board, Water Quality Control Plan, San Francisco Bay Basin, July 21, 1982, page 4-31.

16. Redford Hall, Ph.D., Chief of Permit Section, San Francisco District, Army Corps of Engineers, telephone conversation, September 11, 1986.

17. Allen Pastron, Ph.D., ArcheoTec, Archaeological Consultant, telephone conversation with EIR Consultant, July 2, 1986.

18. Randall Rossi, Port of San Francisco, telephone conversation, July 2, 1986.

CHAPTER VI. MITIGATION MEASURES

Turbidity Mitigation

1. Hopper dredge methods would be used whenever possible in order to minimize turbidity. All pipelines associated with hopper dredging would be tightly connected to avoid release of sediments into the water column.

2. Whenever possible, dredging would be scheduled to take advantage of the natural dispersive ability of wind and rough water. Calm, undisturbed surfaces hold clouds of suspended particles that cause turbidity longer than disturbed surfaces.

Sedimentation Mitigation

1. The Port has sedimentation studies underway which it is expected will lead to measures to reduce sedimentation and annual maintenance dredging requirements which would be implemented beginning at the end of 1987.[1]

2. Disposal of dredge spoils would occur at times coinciding with ebb tide (when the tide recedes) so that maximum oceanward dispersion of sediments is achieved.

Biological Mitigation

1. The project sponsor would consult with the California Department of Fish and Game before setting the time for dredging in order to minimize impacts on spawning herring.

MITIGATION NOTE

1. Vello Kiisk, Port Engineer, telephone conversation, September 10, 1986.

CHAPTER VII. SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

This chapter is subject to final determination by the decision-making bodies as part of their approval processes.

Short-term effects of dredging activities in the project area which cannot be avoided include:

- temporary turbidity of waters adjacent to, and including, the project area and disposal site;
- disturbance of benthic organisms living in the Bay muds to be dredged;
- temporary increased sedimentation of areas near the dredge and disposal sites;

These effects would be temporary and are not expected to be greater than the effects of past Port maintenance dredging which have not been significant.

Up to now, the Corps has not found that the combined effect of all present and proposed dredging activities would have a significant cumulative impact. Other agencies, such as the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Regional Water Ouality Control Board, have expressed a greater degree of concern.[1] Some of this concern is based on perceived inadequacies of the elutriate test and the potential failure of this test to detect pollutants harmful to organisms in the Bay. Since direct chemical analyses of the sediments to be dredged, a more sensitive test for the presence of pollutants, does not indicate the presence of chemical contaminants in the sediments to be dredged in the proposed project, dredging of these sediments would not be expected to have chemical effects on organisms. The rest of the agency concern relates to the cumulative

effects of sediment deposition in the Bay which is expected to be mitigated in the short term by Corps management measures and in the long term by changes in management, such as the designation of non-Bay disposal sites or stricter standards for disposal at Alcatraz.

Because the Corps of Engineers will impose scheduling constraints when cumulative proposed dredging and spoils disposal activities in the Bay exceed the capacity of the Bay disposal sites, and because the volumes of spoils disposal proposed as part of the proposed project are not considerable when viewed in connection with other past, current and probable future projects, the proposed dredging and spoils disposal could not have a significant impact on the environment.

SIGNIFICANT IMPACTS NOTE

1. Alan R. Pendleton, Executive Director, BCDC, Background Information on the Accumulation of Dredge Spoils at the United States Army Corps of Engineers' Alcatraz Disposal Site, memo to All Commissioners and Alternates, August 22, 1986, available for public review in the case file at the Department of City Planning.

CHAPTER VIII. ALTERNATIVES

Alternative 1. No Project

Description

No new area would be dredged and access/egress to the SFCT would remain unchanged.

Impacts

Without the proposed project, existing channels would continue to pose access problems for deep-draft vessels approaching the SFCT-South under some tidal conditions and sharp turns would continue to be required of vessels using the east-west channels to approach or leave the SFCT-South. The SFCT FEIR indicated that deep-draft vessels were to be accommodated by the facility (see page 40). The goal of the container operation to maximize throughput at minimum cost would not be achieved if vessels with a 38 foot draft were to choose to go to other ports with more convenient approach channels available.

Alternative 2. Reduced Dredging

Description

All reduced dredging alternatives would include dredging Area B to a 40 ft. depth for a new access/egress route. Southern approaches to the SFCT-South are needed during conditions of strong southerly currents because pilots are reluctant to approach berthing areas with strong currents behind them. It is standard practice to approach berthing areas while moving against a current.

Under the reduced dredging alternative, either Channel A or Area C would not be dredged. If only two channels were dredged, instead of three, (either channels A and B or area C and channel B), the total volume of sediments to be disposed of would be reduced by approximately one third, from 1.4 million cubic yards to about 950,000 cubic yards.

Impacts

Impacts associated with reduced dredging would be similar to those evaluated with the proposed project. Turbidity and sedimentation impacts would be less since two areas would be dredged rather than three. Localized turbidity and sedimentation in the areas to be dredged would be the same as for the proposed project. No dredging impacts would occur at channel A or area C if they were not dredged.

The reduced dredging alternative would require disposal of an estimated 950,000 cubic yards of sediments, or 68% of the 1.4 million cubic yards of spoils from the proposed project.

This alternative would allow only one channel with improved configuration for deep-draft vessel access to the berths at the SFCT-South and the Bar Pilots would have no choice of access route from the north to the SFCT-South. Access/egress options to and from the south would be improved as for the proposed alternative. This alternative was discarded by the Port because it would not optimize use of SFCT-South berths by deep-draft vessels.

Alternative 3. Increased Dredging

Description

In addition to the proposed project, new Channel D (see Fig. 3, page 40) would be dredged to 40 ft. to improve the access of deep-draft vessels to the SFCT.

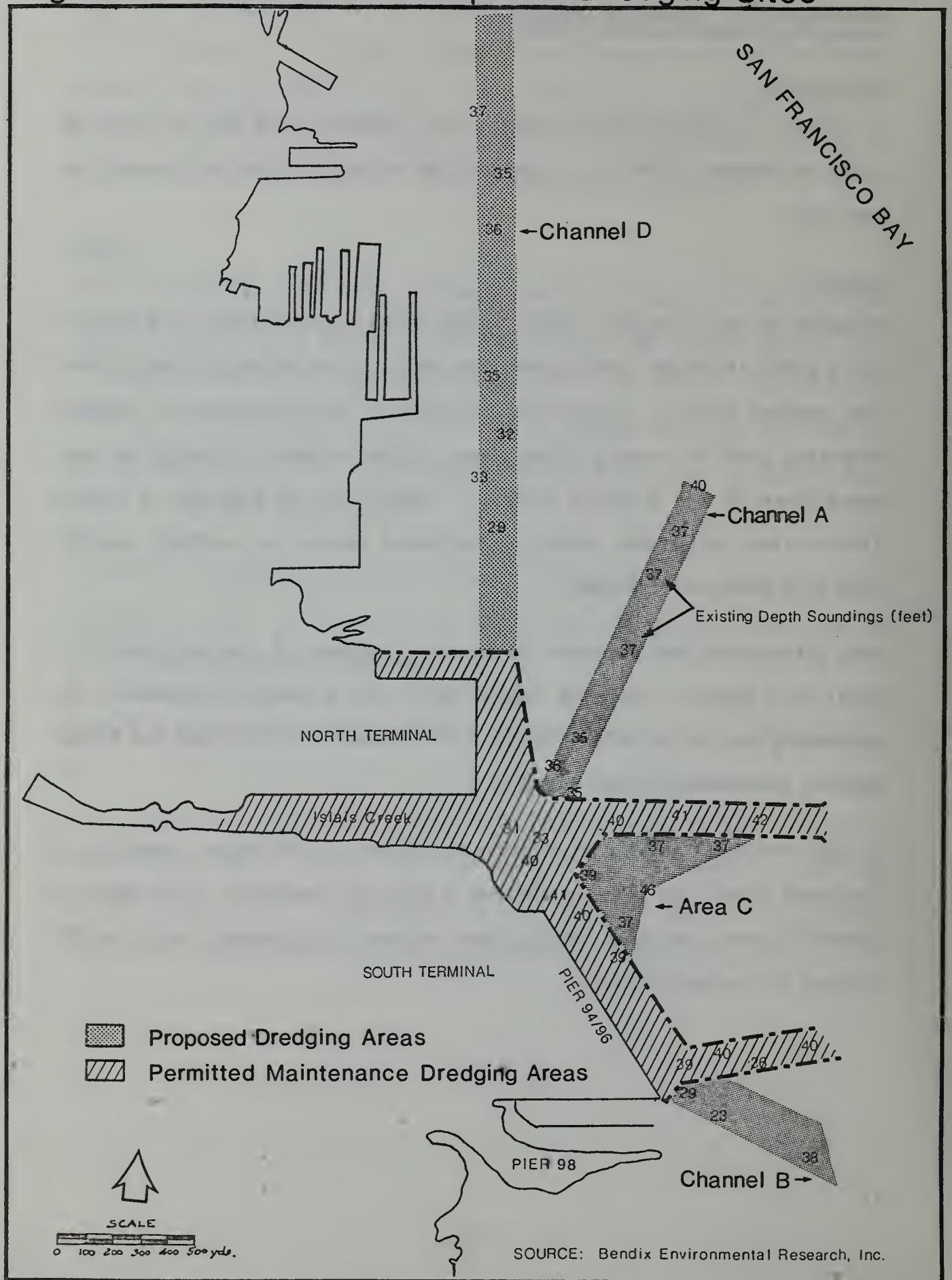
Impacts

Dredging of this new ship channel would produce an additional 1.8 million cubic yards of dredge spoils, more than doubling the volume of spoils from the proposed project. Impacts due to turbidity and disturbance of benthic organisms would be roughly proportional to the volumes of spoils, or over twice those of the proposed project. Impacts due to exposure of marine life to toxic pollutants cannot be estimated because no sediment samples from this area were analyzed.

This alternative was discarded by the Port because of concern about disposal of a greater volume of dredge spoils and a poorer cost/benefit relationship due to the longer length of the channel to be dredged and higher cost of future maintenance dredging.

If the Port were to consider this alternative in the future, sampling of sediments within the proposed Channel D would be conducted. Assessment of potential toxic pollutant impacts from sediment displacement would require further environmental review.

Figure 3. Alternative 3 Proposed Dredging Sites



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CHAPTER XI. APPENDIX

Commercial and Sport Fishes of the San Francisco Container Terminal Vicinity.

Species	Abundance*	Notes on Migration & Spawning**
brown smoothhound *Mustelus henlei*	C	
leopard shark *Triakis semifasciata*	C	Present most of the year; largest numbers caught in fall.
bat ray *Myliobatis californica*	C	
white sturgeon *Acipenser transmontanus*	O	Migrates up rivers to spawn.
northern anchovy *Engraulis mordax*	C	Mostly caught in summer in this area.
Pacific herring *Clupea harengus pallasii*	C	Spawns December through March; southern S.F. waterfront and vicinity is now the major spawning area in S.F. Bay. Demersal eggs on submerged rocks, pilings, riprap, plants, etc.
longfin smelt *Spirinchus thaleichthys*	C	Present in early summer; spawns in Suisun Bay and Delta.
jacksmelt *Atherinopsis californiensis*	C	Spawns in October-March; demersal eggs on plants.
topsmelt *Atherinops affinis*	C	Demersal eggs on plants.
striped bass *Morone saxatalis*	C	Migrates up rivers to spawn, usually in April and May.
white croaker *Genyonemus lineatus*	O	Spawns in early spring.
walleye surfperch *Hyperprosopon argenteum*	C	Live-bearing, October-December.

* C = Common, O = Occasional

** (a) Demersal eggs are attached to submerged objects and thus are susceptible to smothering by siltation; pelagic eggs are free in the water. (b) These fish species are thought to be present year-round unless otherwise noted.

Species	Abundance	Notes on Migration & Spawning
black surfperch *Embiotoca jacksoni*	C	Live-bearing.
striped surfperch *Embiotoca lateralis*	C	Live-bearing.
barred surfperch *Amphistichus argenteus*	No data available	Live-bearing in winter.
rubberlip surfperch *Rhacochilus taxotes*	C	Live-bearing.
pile surfperch *Damalichthys vacca*	C	Live-bearing.
shiner surfperch *Cymatogaster aggregata*	C	Live-bearing, all seasons.
brown rockfish** *Sebastes auriculatus*	C	Live-bearing in winter.
lingcod *Ophiodon elongatus*	C	Mainly juveniles; most adults occur in deeper waters. Spawns December-March, demersal eggs on rocks.
cabezon *Scorpaenichthys marmoratus*	C	Spawns November-March, demersal eggs on rocks.
monkeyface-eel *Cebidichthys violaceus*	No data available	Spawns in spring, demersal eggs on rocks.
Pacific sanddab *Citharichthys sordidus*	C	Spawns July-September, pelagic eggs.
longfin sanddab *Citharichthys xanthostigma*	No data available	Spawns July-September, pelagic eggs.
California halibut *Paralichthys californicus*	O	Mostly caught in summer and early fall. Spawns April-July, pelagic eggs.
diamond turbot *Hypsopsetta guttulata*	O	Spawns early spring, pelagic eggs.
starry flounder *Platichthys stellatus*	C	Spawns November-February, pelagic eggs.

** Also other *Cebastes* species.

SOURCE: Holton Associates